



Separation

Ecology Fact Sheet

Publication Number 96-418, Revised December 2002

This document may be used by generators interested in treating their own waste by separation, on-site, in accumulation tanks or containers. Generators of hazardous waste who comply with these standards, and the standards in Technical Information Memorandum (TIM) #96-412, *Treatment by Generator*, will meet the requirements of the *Dangerous Waste Regulations*, Chapter 173-303 WAC.

This Fact Sheet provides guidance only for treatment by generator. If treatment is done according to this guidance document, a permit or other written approval is not necessary.

Description and Definitions

Air flotation

Separating solids from liquids by attaching air bubbles to the solid particles. The solid particles and attached air bubbles rise to the surface of the liquid, agglomerate there, and are skimmed off. This process often follows flocculation.

Centrifugation

The separation of materials of dissimilar densities by the application of centripetal acceleration. This process is often applied to sludges in order to separate water or oil from the solid material.

Coagulation or Flocculation

Combining or aggregating suspended colloidal particles so they form small clumps. Flocculated particles are commonly removed by gravity sedimentation, air flotation, or filtration.

Decanting

The process of actively separating materials by utilizing differing specific gravities. Decanting commonly follows flocculation and/or sedimentation. The clarified supernatant is removed and the solids are preferentially concentrated in a smaller fraction of the liquid.

Emulsion Breaking or Demulsification

The process of “breaking” a stable mixture of two or more immiscible liquids which are held in suspension by emulsifying agents. Detergents and wetting agents are common emulsifiers. Demulsification separates the immiscible liquid phases, and is typically followed by phase separation.

Ion Exchange

The process by which ionic solutes are removed from solution by adsorption onto a solid substrate, such as resin beads, in exchange for other non-hazardous ions such as Ca^+ . This process is often used for the removal of metal cations from wastewaters.

Oil Skimming or Phase Separation

The equivalent of decanting for liquid-liquid systems where the liquid phases are immiscible and/or have differing specific gravities. This process can follow demulsification.

Precipitation

Forming an insoluble precipitate from dissolved materials, usually by adding chemical precipitants.

Sedimentation or Clarification

The settling out by gravity of solid particles suspended in a liquid.

Applicability

Separation processes are applicable to solid/liquid mixtures, and mixtures of liquids with different densities. The processes defined above are consistent with this blanket guidance, if they meet the requirements of the Technical Information Memorandum (TIM) #96-412, and the criteria below.

If the department determines that the treatment process poses a threat to public health or the environment, the generator may be required to obtain a treatment permit. If the treatment is part of a wastewater treatment operation [regulated by Permit by Rule (PBR)], or the waste is being treated to meet Land Disposal Restriction (LDR) standards, please see “Other Regulatory Requirements”, below.

This document is intended solely as guidance. It addresses only the requirements of the *Dangerous Waste Regulations*. The generator is still ultimately responsible for complying with all applicable federal, state and local requirements relating to on-site waste management. Based on the analysis of specific site circumstances, Ecology officials may require a generator to manage their waste in a manner other than as specified in this guidance. Ecology may also revise this Fact Sheet at any time.

Criteria

The following criteria apply in addition to the guidance in TIM #96-412:

All separation processes listed above must meet the following criteria:

- 1) Assure that ignitable or reactive waste treatment in tanks complies with WAC 173-303-640(9)(a).
- 2) Precipitating, flocculating and demulsifying agents must not change the chemical structure of the waste materials, other than to form precipitates.
- 3) No processes which generate toxic or flammable gasses or volatilize dangerous waste materials directly to the air may be used.
- 4) All necessary ancillary mechanical devices such as mixers, air spargers, and skimming devices must be included in the tank assessment.
- 5) All decanting and phase separation in tanks must utilize valves and piping which are a permanent certified part of the tank system.

Other Regulatory Requirements

More detailed information on this guidance, or other mechanisms for treatment by generator if this guidance does not apply, is found in Technical Information Memorandum (TIM) #96-412, *Treatment By Generator*. Generators must assure compliance with all applicable sections of the *Dangerous Waste Regulations*, Chapter 173-303 WAC, such as proper designation of waste(s); accumulation, handling and labeling standards; reporting standards; spills and discharge requirements; etc. Information on appropriate permit by rule and LDR requirements may be found in the TIM. In addition, the generator must comply with all other applicable federal, state, and local regulations.

Case Example

The separation process is commonly applied to metal containing solutions. This process can be followed by sedimentation or filtration, either of which may be aided by flocculation. The precipitate must be designated and managed appropriately. Supernatant (e.g., water) must be either designated and managed appropriately or reused.

Ecology is an equal opportunity agency. If you have special accommodation needs, or require this document in alternate format, please call the Hazardous Waste and Toxics Reduction Program at (360) 407-6700 (Voice) or 711 or (800) 833-6388 (TTY).

Ecology Assistance

For more information please contact a hazardous waste specialist at one of the following Ecology offices:

Northwest Regional Office	425-649-7000
Southwest Regional Office	360-407-6300
Central Regional Office	509-575-2490
Eastern Regional Office	509-329-3400
Industrial Section	360-407-6916
Nuclear Waste	360-407-7100